

June 9th, 2010

Development Permit Application

Synthetic Turf Field Lighting at Jericho Park West Site

Project Location

Site Address: 3941 Point Grey Road, Vancouver, B.C.

Legal description: Lot 7

District Lot: Plan BCP 22608

Parcel Identifier: 016622413

Brief Description of Proposal

This is an application by the Vancouver Board of Parks and Recreation (VBPR) to install a purpose-built sports lighting system to illuminate one 70 m by 110 m soccer field on the site of an existing rugby field. Associated works are a perimeter path, landscaping and renovated tennis courts. The project is funded in part by Federal and Provincial funding through the Recreational Infrastructure Canada program and the project must be completed by March 31st, 2011.

Installation of the synthetic turf will allow more efficient utilization of the field because the synthetic turf does not have to be “rested” like natural grass. Full utilization of a synthetic turf field is roughly equivalent to the allowable use of five natural turf fields. Lighting is installed to meet the needs for use of the field after dusk further enhancing the utilization of the field and associated economic benefits.

The field users will be local community groups, schools and community sports leagues and other organizations. The field will see its main use after 5:00pm on weekdays and all day use during the weekends.

The state-of-the-art lighting installation will consist of four sports lighting poles with sports lighting luminaires. The luminaires will be equipped with spill and glare control devices that will maximize light on the field of play and minimize obtrusive light impacts in the adjacent neighborhood. The poles are a high mast system that will allow more directed light onto the fields and reduce “spill” lighting to adjacent areas. The fields will be lit to accommodate both game play and recreational play. Similar lights have been installed by VPB at Point Grey (2006) and Vancouver Technical School (2008), with a favourable response from the community.

It is proposed to begin construction in June 2010 and have substantial completion by late fall, 2010.

Description

Jericho Park West is bounded by 4th Avenue on the south, Discovery Street on the west, and English Bay to the north. Adjacent land uses are park, youth hostel, community centre and sailing centre. The site for the synthetic field is east of Discovery Street (see site plan in **Appendix 1**).

Staff have prepared plans for the synthetic turf field and tennis courts. This concept was most recently presented to the public at an Open House held on March 24th, 2010, with about 20 people attending. Seven people filled out questionnaires and most were supportive of the plans. The one respondent who was not supportive was concerned about the impacts to the environment and the prioritizing of this project over other City projects.

With regard to the field development, the west field was selected to reduce the impact on the natural areas to the east and south of the fields. Also, staff have been working with consultants in developing the drawings for the field, which would include state-of-the-art lighting, with technology to reduce glare and spill light. These lights would be similar to what were successfully installed at Point Grey and Vancouver Technical schools, where the lighting has not been an issue.

There is an existing line of mature chestnut trees along Discovery Street that will be retained to provide buffering to the adjacent youth hostel.

Lighting

The proposed lights are an integral part of the installation of an artificial turf field, critically needed to take the pressure off the publicly provided natural grass fields in the VBPR inventory. Lighting enables evening play through winter months, taking advantage of the fact that artificial turf can accommodate continuous use. As stated earlier, one lit synthetic turf pitch has up to five times the playing capacity of a regular grass playing field.

The proposed lighting system has been designed and will be installed to keep neighbourhood impacts to a minimum. The 350 lux light level is consistent with the prescribed level for school and community play, and the spill light is minimal and consistent with prescribed light trespass levels. Our goal is to ensure that light does not spill into the adjacent neighbourhood beyond typical ambient levels. The lights would be on a timing system so that the latest the lights would be on is 11:00 PM, with an automatic system that turns off the lights if the field is not in use.

The sports lighting for this project will be designed to meet the minimum light level recommendations of the Illuminating Engineers Society of North America (IESNA) for

they type of sport and level of play anticipated. The IESNA has published a recommended practice for sports lighting, IESNA publication RP-6-01 Recommended Practice for Sports and Recreational Area Lighting (RP-6). This document includes various recommendations for lighting of both indoor and outdoor sports facilities, including soccer facilities, and is the generally accepted basis for illuminating sports fields throughout North America. These recommendations are meant to satisfy the needs of both players and spectators.

The lighting for this facility is also being designed to meet the IESNA recommendations for obtrusive light. Because outdoor sports facilities are among the most brightly lit facilities in a community, minimizing light trespass is a key project objective. The IESNA has established recommended maximum acceptable levels for obtrusive light in IESNA publications RP-33 *Lighting for Exterior Environments* (RP-33) and TM-11 *Technical Memorandum on Light Trespass: Research, Results, and Recommendations* (TM-11). These publications establish the generally accepted practice in North America for the control of obtrusive light.

Sports Field Lighting Levels and Uniformities

The IESNA has established a Class of Play system for determining the recommended minimum level of light and uniformity of light needed for safe play. The Class of Play system includes considerations for the skill level of the players and the number of spectators being accommodated, and is shown in *Figure 1 – IESNA Sports Lighting Class of Play System*.

Table 1 – Class of Play and Facilities				
Facility	Class			
	I	II	III	IV
International	X			
National	X			
Professional	X			
College	X	X		
Semi-professional	X	X		
Sports clubs	X	X		
Amateur leagues		X	X	
High schools		X	X	
Training facilities			X	X
Elementary facilities			X	X
Recreational facilities				X
Social events				X
Spectators				
Class I – Facilities with spectator capacity of 5000 to 200,000				
Class II – Facilities for spectators of 5000 or less				
Class III – No special provisions for spectators				
Class IV – Social and recreational, i.e., noncompetitive				

Figure 1 – IESNA Class of Play System for Sports Lighting

Field programming for the Jericho Park West Site is anticipated to include games and practices for school, recreational and club play. The anticipated activities are not expected to attract spectators in any large numbers. The majority of the activities

anticipated on the field will be at the Class III and Class IV level of play. As a result, this facility should be lit to meet the minimum recommendations of the IESNA as a Class IV facility, with provisions to adjust the lighting to a Class III level of play. To provide the adjustability, a step-level dimming system will be installed.

Based on the Class of Play noted above, the lighting recommendations for this facility are shown in the shaded rows in *Figure 2 – IESNA Recommended Illuminance and Uniformity for Soccer*. To meet the requirements of Class III play, the lighting level required is a minimum of 300 lux.

IESNA Class of Play	Minimum Maintained Average Horizontal Illuminance (lux)	Uniformity (max:min)
I	1000 lux	1.71:1
II	500 lux	2.5:1
III	300 lux	3.0:1
IV	200 lux	4.0:1

Figure 2 – IESNA Recommended Illuminance and Uniformity for Soccer

Establishing Maximum Obtrusive Light Limits

Obtrusive lighting is defined by three major interrelated elements, each considered separately. The three elements include the following.

- Spill light
- Glare
- Sky glow

In general, obtrusive lighting is any lighting that is discerned beyond the area that is being lit and, which by its nature or presence is obtrusive to individuals. The elements of obtrusive light are depicted in *Figure 3 – Obtrusive Light Components*.

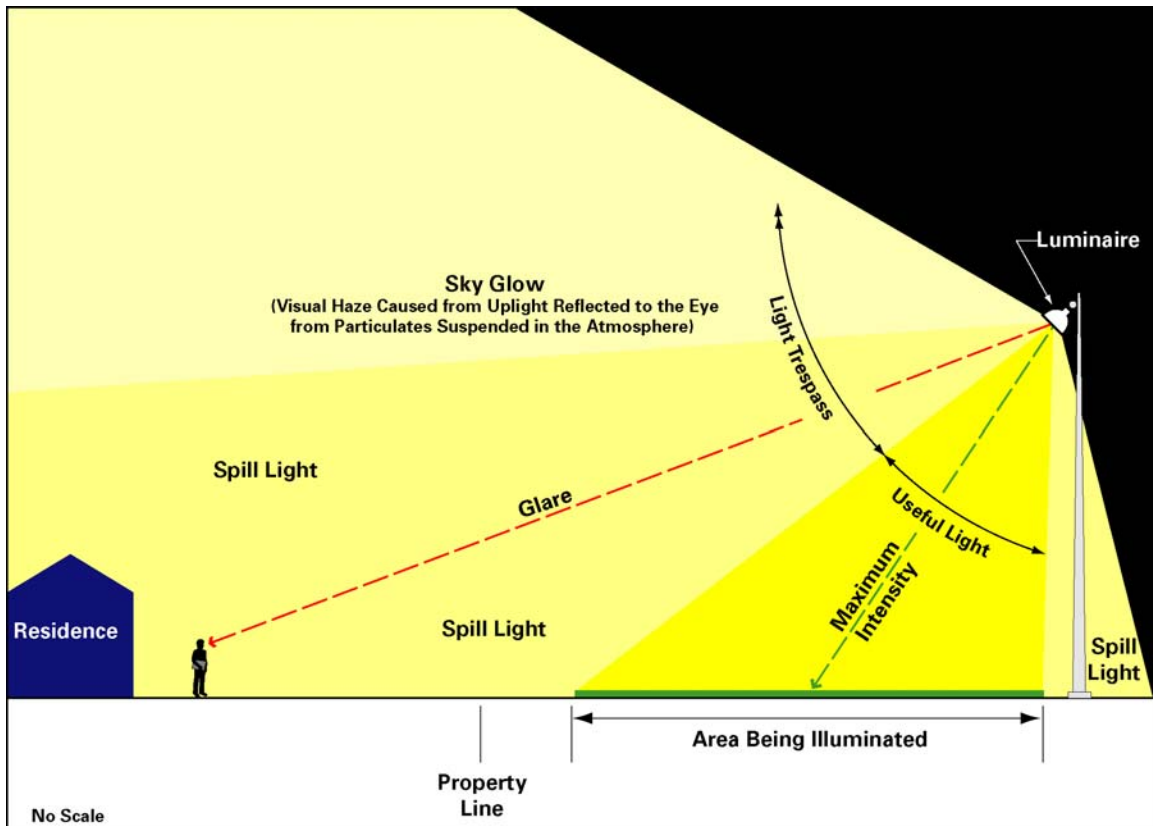


Figure 3 – Obtrusive Light Components

The only generally accepted method for the measurement and calculation of obtrusive light in North America is based on spill light, that is, illumination falling beyond the property line as measured in the vertical plane at eye level with the illuminance meter receptor pointed at the brightest light source. This type of light is known as “eye illuminance” (E_e). The method for calculating and measuring E_e is established and explained in TM-11, which was based on an obtrusive research study.

Maximum acceptable levels of spill light (“eye illuminance”) for a facility are based on Lighting Environmental Zones (LEZs) that have been developed by lighting organizations, such as the IDA and the IESNA. These zones are nearly identical to similar “E Zones” established by the CIE in Europe.

Areas are classified into one of four LEZs, ranging from LEZ 1, the most restrictive, to LEZ 4, the least restrictive as shown in the *Figure 4 – Maximum Amount of Spill Light for Lighting Environmental Zones*. The figure also details the maximum allowable spill light for both pre-curfew and post curfew periods. A curfew, for the purpose of obtrusive light, is a point in time at which non-essential lighting is to be reduced or extinguished. Curfews are established by local agencies. In North America, 11:00 p.m. is a commonly accepted curfew time, although the curfew time may vary from community to community. Since the sports lighting for the Jericho Park West Site facility will be turned off at or prior to curfew, only the pre-curfew E_e levels apply.

Designation	Description	Recommended Maximum Illuminance Level (Ee)	
		Pre-Curfew	Post-Curfew
LEZ 1	Intrinsically dark areas of minimal ambient brightness such as National Parks and areas of outstanding beauty	1.0 lux	0.0 lux
LEZ 2	Areas of low ambient brightness such as rural or suburban areas	3.0 lux	1.0 lux
LEZ 3	Areas of medium ambient brightness such as urban residential neighborhoods	8.0 lux	3.0 lux
LEZ 4	Areas of high ambient brightness such as dense urban areas with mixed residential and commercial uses.	15 lux	6.0 lux

Figure 4 – Maximum Amount of Spill Light for Lighting Environmental Zones

The synthetic turf field site at Jericho Park West is surrounded by other park areas, a sailing centre, a youth hostel and a community centre, although any possible negative light impacts would be to the residential area to the south past the community centre, which would be described as an urban residential neighborhood, LEZ 3, as depicted by the shaded row. The sports lighting design for the facility, therefore, should limit spill light to a maximum of 8.0 lux at the property line of any residences to meet the recommendations of the IESNA and IDA.

The spill light on adjacent properties from this facility will be far less than the spill light from a typical street lighting system. At a distance of 100 meters to the south, the maximum light level is 0.25 lux at 2nd Avenue, but these levels will be far less than the maximum recommended allowable for this type of area (8 lux for urban residential neighbourhoods). The anticipated increased Lux levels are illustrated in **Appendix 2 Jericho Park West Lighting Control Plan**. To put this lux level in perspective, the level under a typical street lighting is 15 lux, and under moonlight is 0.1 lux.

Sports Lighting Design

Not every type of sports field lighting fixture deals with light trespass in an equal fashion. Good design and choosing a suitable fixture is an important part of reducing all aspects of obtrusive light. Manufacturers typically produce a range of products to satisfy a segmented market and deal with a variety of specified performance criteria, and performance may vary from manufacturer to manufacturer. *Figure 5 – Sports Lighting Fixture Comparison* below illustrates the differences in off-site glare encountered on the basis of a digital photograph. Each of the fixtures seen in the photograph were certified by an electrical engineer to have been mounted at the same height (the tall fixture is an existing street lamp in the foreground, not a sports field lighting fixture), identically aimed, and having the same beam spread and lamp wattage. As one can see, the ability of the fixtures to control glare varies between the fixtures.

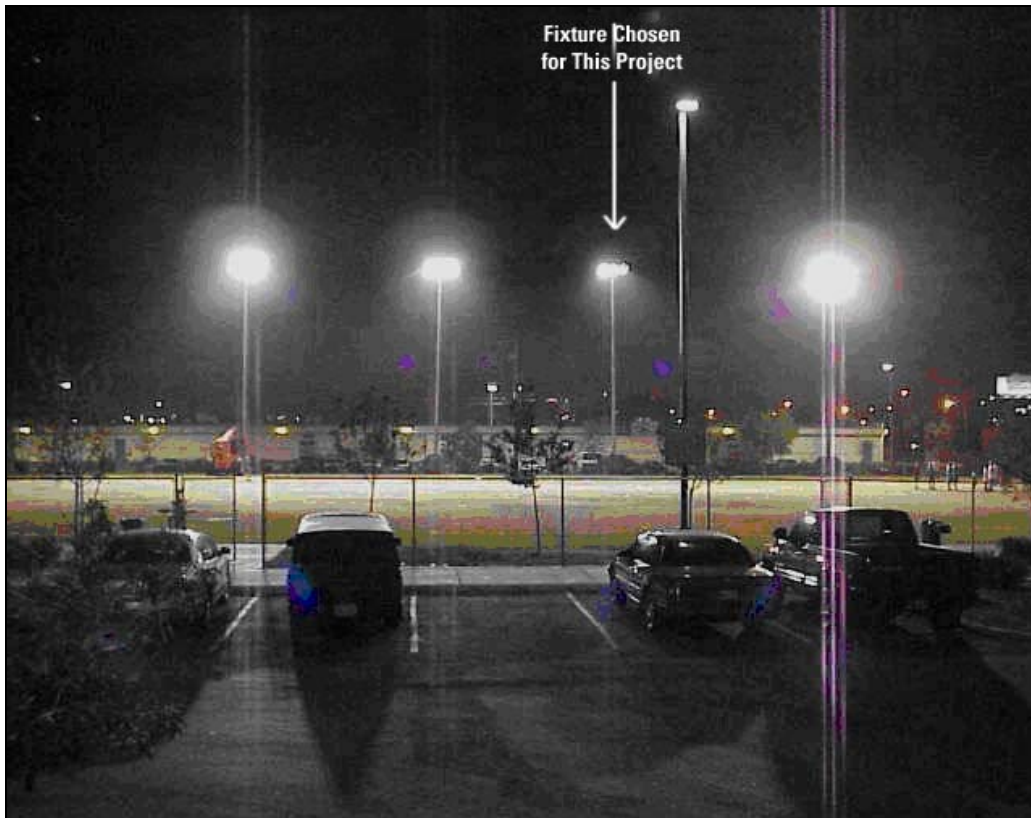


Figure 5 – Sports Lighting Fixture Comparison

The sports lighting for this project is based on the use of fixtures mounted on galvanized steel poles with each fixture having comprehensive light spill control devices. In *Figure 5 – Sports Lighting Fixture Comparison* the fixture selected for this project is the second fixture from the right. The light spill control devices involve internal shielding, glare control visors, inserts and other photometric devices to reduce obtrusive light impacts (offsite glare, spill light and sky glow) and direct a majority of the light onto the field.

The sports lighting system for this project will include four sports lighting poles approximately 21.3 m (70 ft.) high. Using tall poles allows the sports lighting fixtures to be aimed almost directly downward which greatly reduces spill light. The maximum intensity of the beam emitted from the fixtures will be aimed at the centerline of the field.

To further illustrate how the field will control obtrusive light the following photograph is provided in *Figure 7 – Typical Class IV Soccer Field with LSG Fixtures*. This facility uses the same number of poles, the same light spill control fixtures, and similar pole heights. The manner in which the fixtures cut off the light is clearly visible from the photograph.



Figure 7– Typical Class IV Soccer Field with LSG Fixtures

Impacts

The development of these fields will be such as to reduce the impacts on the area.

Area Improvement

This proposal will increase the attractiveness of the area. The increased activity and presence of field users will allow park users to feel safe in this area. The lighting that will spill onto the perimeter path and sidewalk will allow safe and comfortable use by pedestrians, similar to the way the lighting has increased use and feelings of safety at Point Grey and Vancouver Technical field sites. The fields will not disrupt the existing vegetation so the field will continue to be surrounded by landscaping and street trees to give an overall feel of greenness to this area.

Lighting

The proposed lights are an integral part of the installation of an artificial turf field installation, needed to take pressure off of the natural grass fields in the system. This allows for extended play after sunset when demand is high, especially week days through the winter.

The proposed lighting system has been designed to keep neighborhood impacts to a minimum, and to save energy. Spill light from this facility is minimal, and is calculated to be below the maximum recommended by the IESNA for this type of area. The lights will be controlled by a system that ensures that they will be turned off by 11:00 p.m. The

controls for this facility will be designed to ensure that the lights are only energized when manually activated prior to the start of each session.

Parking

The construction of a synthetic turf field on an existing grass play field does not increase peak demand for vehicular parking. Peak demand typically occurs at the end of a game or practice when coaches and players are arriving for the next session. Peak demand therefore consists of 4 teams. With 10-12 spaces per team, peak demand is typically 40-50 spaces.

Peak demand is achieved more frequently with a synthetic turf field when compared to a grass play field. This is because a synthetic turf field accommodates 2000+ hours of play per year while grass play fields accommodate 600 hours of play per year. Staff estimate that peak demand is achieved 600-800 times per year for a synthetic turf field while peak demand occurs about 200 times per year for a grass play field.

There are four public off-street parking lots near the site with a total capacity of 409 spaces. Street parking is allowed along Northwest Marine Drive adjacent to the park. The closest residential block is on the south side of the 400 block of W. 2nd Ave.

About 10% of off-street parking is required to meet the peak demand for the synthetic turf field. Staff anticipate that peak demand can easily be accommodated with the existing supply of off-street parking throughout the year except during weekends from June through August when Jericho Beach is at its busiest.

Washrooms

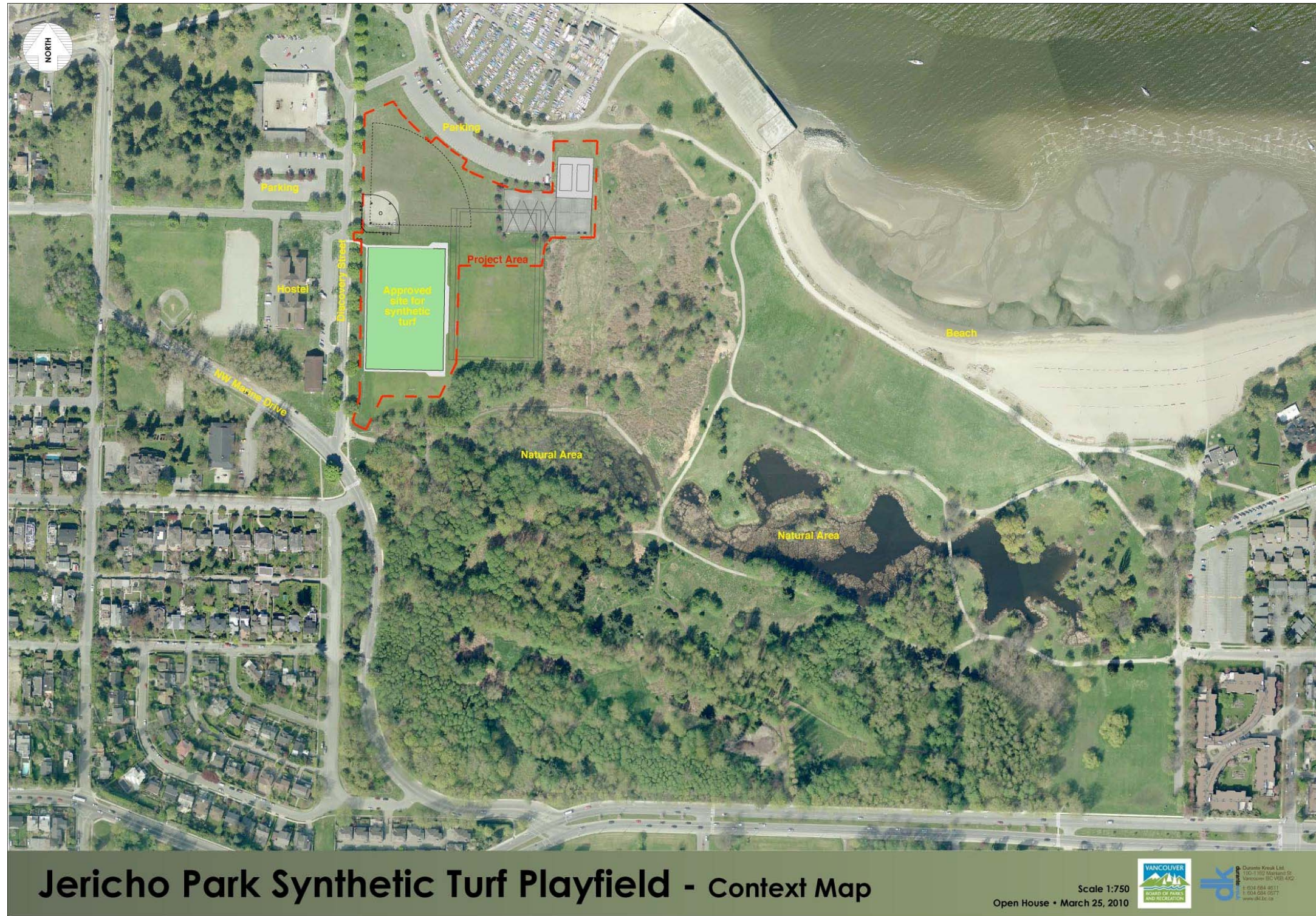
There are existing washrooms across Discovery Street from the new synthetic turf field.

Should any further information be required in the development of this permit application, please contact Ted Uhrich at (604) 257-8474 or ted.uhrich@vancouver.ca

Attachments:

1. Appendix 1: Jericho Park West Site Plan
2. Appendix 2: Jericho Park West Spill Control Lighting Plan

Appendix 1 – Jericho Park West Site Plan



Jericho Park Synthetic Turf Playfield



Spill Light
0 20m 40m



Spill Light Example
Urban soccer field with spill and glare control fixtures illuminated to 370 lux with 24m high poles. Photo taken approximately 50m from the edge of the field.

Typical Lighting Examples	Levels
Sunny Day Outdoor	10,000 lux
Overcast Day	1,000 lux
Illuminated College Football Stadium Lighted for TV	1,000 to 1,500 lux
Illuminated Office Space	500 lux
Illuminated Local Soccer Field	350 lux
Illuminated Golf Driving Range (at 200 yards)	100 lux
Typical Street Lighting	4 - 17 lux
Typical Illuminated Parking Lot Lighting	20 - 30 lux
Full Moon	0.1 lux

Approximately convert lux to foot candles (fc) by dividing by 10.

